AMENDMENTS

In the Claims:

1. (Currently amended) A method for secure transmission of an information-containing optical signal in a reflective/transmissive architecture, comprising:

dividing the optical signal using an optical tapped delay line into a first plurality of spectral sub-bands defined by the equation:

$$F(t,K)=\int_{\omega_K}^{\omega_{K+1}}\int_0^T f(S+t)\,e^{j\omega S}\,dS\,d\omega$$

where

i. t = aperture of the hyperfine device (tap key),

ii. S = time integration variable,

iii. ω = frequency, and

iv. K = sub-band index,

modifying each of the first plurality of spectral sub-bands to encrypt the information contained in the optical signal by at least one of (i) imparting a phase shift to each sub-band, (ii) imparting a time delay to each sub-band, and (iii) imparting a frequency shift to each sub-band,

combining the modified first plurality of spectral sub-bands into a combined optical signal,

dividing the combined optical signal into a second plurality of spectral sub-bands,

modifying each of the second plurality of spectral sub-bands to decrypt the previously encrypted information contained in the optical signal by at least one of (i) imparting a phase shift to each sub-band, (ii) imparting a time delay to each sub-band, and (iii) imparting a frequency shift to each sub-band.

2. (Previously Presented) The method of claim 1 wherein the information-containing optical signal has a bandwidth and at least one of the first and second plurality of spectral sub-bands has a sub-band resolution at least 50 times finer than the bandwidth of the information-containing optical signal.

3. (Original) The method of claim 1 wherein the information-containing optical signal is transmitted at a bit rate of not less than 1 gigabit per second.

4. (Previously Presented) The method of claim 1 wherein the information-containing optical signal is transmitted at a bit rate of not less than 10 gigabits per second, wherein at least the first plurality of spectral sub-bands comprise not less than 50 spectral sub-bands and wherein at least the first plurality of spectral sub-bands has a spatial resolution at a focal plane of not greater than 200 MHz.

5. (Previously Presented) The method of claim 1 wherein the first plurality of spectral sub-bands comprise not less than 100 spectral sub-bands.

6. (Previously Presented) The method of claim 1 wherein at least one of the steps of modifying each of the first plurality of spectral sub-bands and modifying each of the second plurality of spectral sub-bands comprises at least one of imparting a phase shift to each sub-band, imparting a time delay to each sub-band, and imparting a frequency shift to each sub-band.

7. (Original) The method of claim 6 comprising at least one of imparting a phase shift to each sub-band, imparting a time delay to each sub-band, and imparting a frequency shift to each sub-band at a rate that changes over time.

8. (Original) The method of claim 1 comprising imparting a frequency shift to the information-containing optical signal.

9. (Currently amended) A system for secure transmission of an information-containing optical signal, comprising:

at least a first optical tapped delay line configured to enable division of the optical signal into a first plurality of spectral sub-bands defined by the equation:

$$F(t,K)=\int_{\omega_K}^{\omega_{K+1}}\int_0^T f(S+t)\,e^{j\omega S}dS\,d\omega$$

where

v. t = aperture of the hyperfine device (tap key),

vi. S = time integration variable,

vii. ω = frequency, and

viii. K = sub-band index,

at least a first phase modulator configured to enable modification of each of the first plurality of spectral sub-bands to encrypt the information contained in the optical signal by at least one of (i) imparting a phase shift to each sub-band, (ii) imparting a time delay to each sub-band, and (iii) imparting a frequency shift to each sub-band, the first optical tapped delay line being configured to enable combining the modified first plurality of spectral sub-bands into a combined optical signal,

at least a second optical tapped delay line configured to enable division of the combined optical signal into a second plurality of spectral sub-bands,

at least a second phase modulator configured to enable modification of each of the second plurality of spectral sub-bands to decrypt the information previously encrypted by at least one of (i) imparting a phase shift to each sub-band, (ii) imparting a time delay to each sub-band, and (iii) imparting a frequency shift to each sub-band, the second optical tapped delay line being configured to enable combining the modified second plurality of spectral sub-bands into a combined optical signal.

10. (Previously Presented) The system of claim 9 comprising:

at least a third optical tapped delay line configured to enable division of each of the first plurality of spectral sub-bands into a plurality of finer spectral sub-bands, and wherein at least the first phase modulator is configured to enable modification of each of the plurality of finer spectral sub-bands to encrypt the information contained in the optical signal.

11. (Original) The system of claim 9 wherein at least one of the first and second phase modulator comprises a reflective phase modulating array.

12. (Original) The system of claim 9 wherein at least one of the first and second phase modulator comprises a transmissive phase modulating array.

13. (Previously Presented) The system of claim 9 comprising at least one computer for controlling at least one of modification of the first plurality of spectral sub-bands by the first phase modulator and modification of the second plurality of spectral sub-bands by the second phase modulator.

14. (Previously Presented) The system of claim 9 wherein at least one of the first and second phase modulator comprises at least one of a liquid crystal array, a micro-electromechanical systems device, an array of III-V or II-VI semiconductor devices.

15. (Previously Presented) The system of claim 9 wherein

at least a first pair of optical tapped delay lines configured to enable division of the optical signal into a first plurality of spectral sub-bands,

at least a second pair of optical tapped delay lines configured to enable division of the combined optical signal into a second plurality of spectral sub-bands,

wherein at least one of the first and second phase modulator comprises a transmissive phase modulating array.

16. (Canceled)